REMARKS

This paper is responsive to any paper(s) indicated above, and is subsequent to Applicant's 31 October 2007 Amendment. The following supplements the comments/arguments from Applicant's 31 October 2007 Amendment, and reiterates some of the 31 October 2007 comments/arguments.

PENDING CLAIMS

Claims 1-6 and 10-25 were pending in the application, after entry of Applicant's 31 October 2008 Amendment. At entry of this paper, Claims 1-6 and 10-25 remain pending for further consideration and examination in the application.

REJECTION UNDER '112, 1st and 2nd PAR. - TRAVERSED

See 31 October 2008 Amendment.

REJECTION(S) UNDER 35 USC '103

See 31 October 2008 Amendment. Applicant supplements the 103 comments/arguments from Applicant's 31 October 2007 Amendment, and reiterates some of the 103 comments/arguments as follows.

The primary inventor (Mr. Tanaka) has performed a detailed review of the rejection and references, and strongly disagrees with the Office Action's illogical views indicated in the reasons for the final rejection.

More particularly, strong traversal is appropriate, because the Office Action comments misinterpret the cited Rauf article; and especially has not understood the

important Rauf's page 656, third paragraph statement that "**the two-dimensional**

model considered in the article will not apply to this type of roughness".

In reviewing and analyzing the Rauf reference to discuss the differences

between this invention and this citation using illustrations, Applicants have found the

attached "Point 1" and "Point 2" to be helpful in providing helpful

explanation/illustration regarding an understanding of Applicant's claimed invention

and the Rauf reference.

As stated in Applicants' Point 1 sheet, Rauf does explicitly describe that the

results of the Rauf article will not apply to general roughness. Further, Rauf does

not treat line edge roughness of type B illustrated in the Point 1 sheet, but treats line

edge roughness of type A illustrated.

In short, it is respectfully submitted that Rauf and the Examiner have never

recognized the critical problem of the type B line edge roughness to be solved by

Applicant's invention. Please refer to the comments/arguments set forth on

Applicants' attached Point 1 sheet.

In Applicants' Point 2 sheet, it is respectfully asserted that Rauf does not

disclose anywhere that the line width after etching depends upon line edge

roughness.

From studying and reviewing the Office Action comments and contentions

which have been made to now, Applicants note that the Office Action comments

have misinterpreted the meaning of Rauf's "RF parameter" in the article, and

consequently has not properly understood the meanings of Figs. 4 and 5. That is,

the Office Action's "Response to Arguments" in pages 4-5 of the 03 October 2007

Office Action is improper because the Examiner critically misinterprets page 657 of

Rauf. More particularly, Rauf's RF item is a scale for measuring the surface

roughness, and has no relation to line width (Fig.1). That is, Rauf's RF is not at all

applicable to Applicants' invention treating the line width.

Applicant's attached Point 2 sheet refers to Applicants' invention on the

correlation between the line width and the roughness, and the differences between

the claimed invention and the cited Rauf article.

Claims 18 and 20-50 substantially parallel claims 10-15 and 17, respectively,

but use different terminology and include greater detailed limitations. More

particularly, independent claim 18 recites (in relevant part), "trimming condition

calculating means for automatically calculating a trimming condition **including**

trimming timing required for said trimming treatment to obtain a desired mask width

by taking into consideration a pre-measured width dimension of said patterned mask

and a pre-measured amount of **line edge perimeter corrugation extending along**

vertical mask sidewalls, as well as the amount of radicals and the amount of ions

measured by said plasma monitor, **wherein the line edge of the vertical mask**

sidewalls has corrugation consisting of alternating ridges and grooves, and

wherein the amount of line edge corrugation is defined as a protrusion amount

of ones of the ridges of the line edge divided by a protrusion width of the ones

of the ridges of the line edge; wherein the trimming treatment is carried out for

the trimming condition including the trimming timing, calculated by said

trimming condition calculating means."

Support for use of the "corrugation", "protrusion amount" and "protrusion

width" limitations can be found within Applicant's original specification, for example,

at pages 14-15 and also see Applicant's FIGS. 3, 5A-C, 6 and 10A-B. Further, it is respectfully noted that Websters II New College Dictionary, copyright 1999, at page 254, defines "corrugation" as "The state of being corrugated", and defines "corrugate" as "To form or become formed into folds or parallel and alternating ridges and grooves."

Turning now to rebuttal of the applied art, the cited Rauf et al. article's model (discussed within Rauf et al.) only **concerns generalized surface roughness (i.e., not a perimeter edge)**, and specifically excludes (see page 656, right column, ending lines of paragraph which begins as "Experiments have shown...") **"vertical striations"** (analogous to Applicant's "corrugations"). Accordingly, it is respectfully submitted that Rauf et al. nowhere discloses Applicant's arrangement using "a pre-measured amount of **line edge perimeter corrugation extending along vertical mask sidewalls, ..., wherein the line edge of the vertical mask sidewalls has corrugation consisting of alternating ridges and grooves, and wherein the amount of line edge perimeter corrugation is defined as a protrusion amount of ones of the ridges of the line edge divided by a protrusion width of the ones of the ridges of the line edge; wherein the trimming treatment is carried out for the trimming condition including the trimming timing, calculated by said trimming condition calculating means**." That is, Rauf et al.'s taught generalized surface roughness is vastly different from Applicant's "line edge corrugation" features. None of the other references cure this major deficiency with respect to the Rauf et al. reference.

Continuing, claim 19 recites, "wherein the trimming condition calculating means automatically calculating the trimming condition **including both a line edge perimeter corrugation trimming time and a mask proper trimming time, wherein the line edge perimeter corrugation trimming time is directed to lessening the amount of the line edge perimeter corrugation of the patterned mask, and the mask proper trimming time is directed to lessening a width of a major body of the patterned mask**; and wherein the trimming treatment is carried out for the trimming condition **including the line edge perimeter corrugation trimming time and the mask proper trimming time**, calculated by said trimming condition calculating means." Support for such timings may be found within Applicant's specification beginning at page 15, line 22 through page 16, last line.

Again rebutting the Rauf et al. reference, such reference is deficient in not teaching the separate timings utilized within Applicant's claimed trimming condition. Especially given the fact that Rauf et al. does not address line edge corrugation. None of the other references cure this major deficiency with respect to the Rauf et al. reference.

As a result of all of the foregoing, it is respectfully submitted that the applied art (taken alone and in the Office Action combinations) would not support a '103 obviousness-type rejection of Applicant's claims. Accordingly, reconsideration and withdrawal of such '103 rejection, and express written allowance of all of the '103 rejected claims, are respectfully requested.

EXAMINER INVITED TO TELEPHONE

The Examiner is herein invited to telephone the undersigned attorneys at the local Washington, D.C. area telephone number of 703/312-6600 for discussing any Examiner's Amendments or other suggested actions for accelerating prosecution and moving the present application to allowance.

RESERVATION OF RIGHTS

It is respectfully submitted that any and all claim amendments and/or cancellations submitted within this paper and throughout prosecution of the present application are without prejudice or disclaimer. That is, any above statements, or any present amendment or cancellation of claims (all made without prejudice or disclaimer), should not be taken as an indication or admission that any objection/rejection was valid, or as a disclaimer of any scope or subject matter. Applicant respectfully reserves all rights to file subsequent related application(s) (including reissue applications) directed to any/all previously claimed limitations/features which have been subsequently amended or cancelled, or to any/all limitations/features not yet claimed, i.e., Applicant continues (indefinitely) to maintain no intention or desire to dedicate or surrender any limitations/features of subject matter of the present application to the public.

CONCLUSION

In view of the foregoing amendments and remarks, Applicant respectfully submits that the claims listed above as presently being under consideration in the application are now in condition for allowance.

To the extent necessary, Applicant petitions for an extension of time under 37 CFR '1.136. Authorization is herein given to charge any shortage in the fees, including extension of time fees and excess claim fees, to Deposit Account No. 01-2135 (Case No. 500.43597X00) and please credit any excess fees to such deposit account.

Based upon all of the foregoing, allowance of all presently-pending claims is respectfully requested.

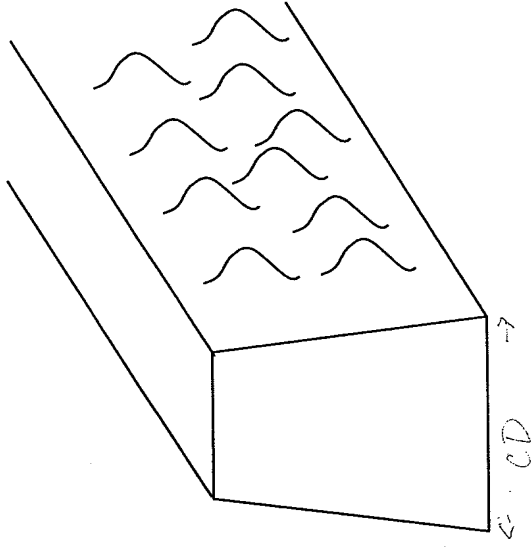Respectfully submitted,

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Point 1

Rauf tells in p.656 paragraph 3,

"Please note that roughness introduced by imperfections in mask and optical image generally leads to vertical striations and the two-dimensional model considered in this article will not apply to this type of roughness."

This is a confess that even with their high skill and experiences they could not infer what will happen in type B LER which is commonly more serious issue than type A LER. Our proposed patent treatstype B LER apparently shown in our figures.

(Line Edge Roughness)

Type B: Commonly observed LER

striations

gate length

Type A: LER described by Rauf

← CD →
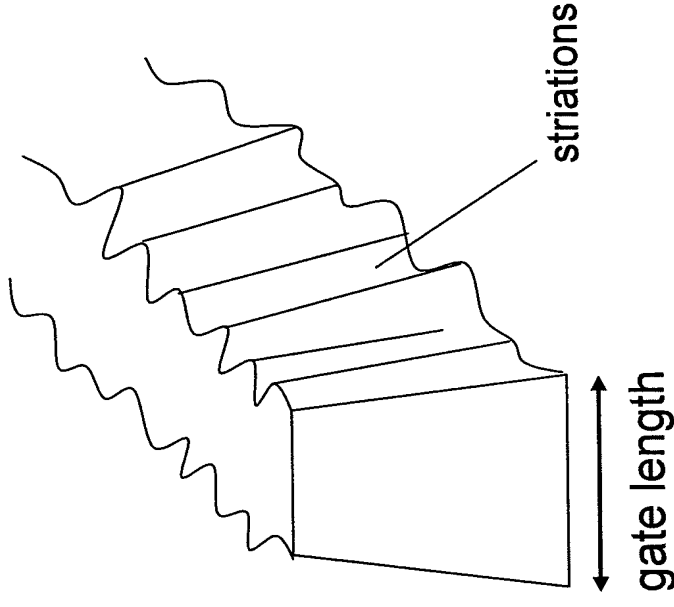
Point 2

Rauf does not tell the correlation between the roughness and the line width.

Otherwise he tells the correlation between the *RF* and the roughness in Fig. 5 and other parts.

RF is not related to line width as shown in Fig. 1.

By its definition in eq. (1), RF is a scale to measure surface roughness.

We cannot use *RF* instead of line width as illustrated in the drawing below.

In fact, the line width after etching are the same for Figs.2 (a) and (b) in Rauf

even though their initial roughnesses are quite different.

He just tells that the RF at 0s and 25s in Fig.2 (b) are different,

in other word, the shape at 25s is smooth.

On the other hand, our proposed patent tells the correlation between

the line width and the roughness. The line width after etching depends on the initial roughness.
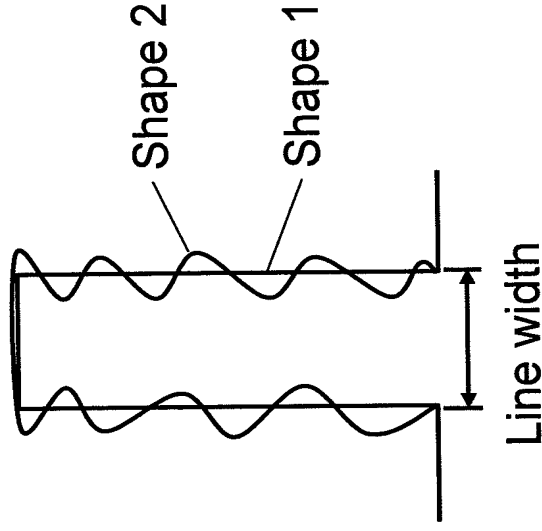
For example, shapes1 and 2 have the same line width. But

the *RF* of shape 2 is much larger than the RF of shape1.

Shape 2

Shape 1

Line width